CLAIMS

What is claimed as new and desired to be protected by Letters Patent of the United States is:

1. A method for producing a high density microwall (HDM) expanded polytetrafluoroethylene (ePTFE) structure, comprising the steps of:

providing an ePTFE tube having a first inner diameter;

radially expanding said ePTFE tube to form a radially expanded tube having a second inner diameter greater than said first inner diameter;

calendering said radially expanded tube while maintaining said second inner diameter substantially constant to form a calendered tube; and

heating said calendered tube above the crystalline melt-point for polytetrafluoroethylene while maintaining said second inner diameter substantially constant to form said HDM ePTFE structure.

2. The method according to claim 1, wherein said radially expanding step comprises radially expanding said ePTFE tube such that said second inner diameter is approximately four times greater than said first inner diameter.

3. The method according to claim 1, wherein said calendering step further comprises a step of creating, along a length of said radially expanded tube, at least one section having a different density than an adjacent section.

4. The method according to claim 1, further comprising a step of manipulating said HDM ePTFE structure to form at least two different inner diameters along a length thereof.

5. The method according to claim 1, further comprising a step of loading a filler agent into said ePTFE tube.

6. The method according to claim 1, wherein said calendering step further comprises the steps of:

positioning said radially expanded tube over a cylindrical mandrel having an outer diameter approximately equal to said second inner diameter to form a loaded mandrel;

placing said loaded mandrel between a first metallic plate and a second metallic plate, wherein said first metallic plate is maintained in a substantially parallel position with respect to said second metallic plate;

applying a force to said first metallic plate, wherein said loaded mandrel is compressed between said first and second metallic plates; and

moving said second metallic plate in reciprocal fashion along a direction perpendicular to the central axis of said loaded mandrel while said first plate is held stationary under a constant load.

7. The method according to claim 6, wherein said placing step further comprises placing a sheet of material between said loaded mandrel and at least one of said first and second metallic plates.

8. The method according to claim 6, wherein said placing step further comprises placing a sheet of material between said loaded mandrel and both of said first and second metallic plates.

9. A method for producing a high density microwall (HDM) expanded polytetrafluoroethylene (ePTFE) structure, comprising the steps of:

providing a non-radially expanded ePTFE tube having a first inner diameter;

calendering said ePTFE tube while maintaining said first inner diameter substantially constant to form a calendered tube; and

heating said calendered tube above the crystalline melt-point for polytetrafluoroethylene while maintaining said first inner diameter substantially constant to form said HDM ePTFE structure.

10. The method according to claim 9, wherein said calendering step further comprises a step of creating, along a length of said radially expanded tube, at least one section having a different density than an adjacent section.

11. The method according to claim 9, further comprising a step of manipulating said HDM ePTFE structure to form at least two different inner diameters along a length thereof.

12. The method according to claim 9, further comprising a step of loading a filler agent into said ePTFE tube.

13. The method according to claim 9, wherein said calendering step further comprises the steps of:

positioning said ePTFE tube over a cylindrical mandrel having an outer diameter approximately equal to said first inner diameter to form a loaded mandrel;

placing said loaded mandrel between a first metallic plate and a second metallic plate, wherein said first metallic plate is maintained in a substantially parallel position with respect to said second metallic plate;

applying a force to said first metallic plate, wherein said loaded mandrel is compressed between said first and second metallic plates; and

moving said second metallic plate in reciprocal fashion along a direction perpendicular to the central axis of said loaded mandrel while said first plate is held stationary under a constant load.

14. The method according to claim 13, wherein said placing step further comprises placing a sheet of material between said loaded mandrel and at least one of said first and second metallic plates.

15. The method according to claim 13, wherein said placing step further comprises placing a sheet of material between said loaded mandrel and both of said first and second metallic plates.